

## CLAIMS

Having thus described the invention, what is claimed is:

1. A static mixer comprising:

a first grid comprising one or more crossing elements and one or more slots adjacent to each crossing element and a second grid comprising one or more crossing elements and one or more slots adjacent to each crossing element,

wherein said crossing elements of said first grid are arranged at intersecting angles to said crossing elements of said second grid; and

at least one elongated connector positioned between and secured to said crossing elements of said first grid and said crossing elements of said second grid.

2. The static mixer of claim 1, wherein said grids are arranged such that each crossing element of one grid intersects a slot in the other grid.

3. The static mixer of claim 2, wherein said crossing elements of said first grid are in a generally parallel relationship relative to one another.

4. The static mixer of claim 3, wherein said crossing elements of said first grid lie within a common plane.

5. The static mixer of claim 4, wherein said crossing elements of said second grid are in generally parallel relationship relative to one another.

6. The static mixer of claim 5, wherein said crossing elements of said second grid lie within a common plane.

7. The static mixer of claim 1, wherein said crossing elements are one of corrugated plates and tubes.

8. The static mixer of claim 1, wherein the static mixer comprises more than two grids.

9. The static mixer of claim 8, wherein each grid comprises crossing elements.

10. The static mixer of claim 9, wherein said crossing elements of each grid are arranged at intersecting angles to one another.

11. The static mixer of claim 10, wherein said connector is positioned between said crossing elements of each grid.

12. The static mixer of claim 1, wherein said crossing elements are one of metal, polymeric, ceramic construction or combinations thereof.

13. The static mixer of claim 1, wherein said connector extends continuously along the entire cross-sectional length of said static mixer.

14. The static mixer of claim 1, wherein said elongated connector is positioned so that it intersects with said crossing elements along at least some of their points of intersection.

15. The static mixer of claim 1, wherein said connector has crossing grooves positioned along the lines of contact of said crossing elements with said connector, wherein said grooves provide a larger bonding surface and mechanical fitting for holding said crossing elements together.

16. The static mixer of claim 15, wherein said grooves are located in a first face of said connector and extend in relationship to said crossing elements of said first grid and wherein said grooves are located in a second face of said connector and extend in relationship to said crossing elements of said second grid.

17. The static mixer of claim 1, wherein said crossing elements are secured to said connector by one of welding, brazing, gluing and combinations thereof.

18. A method of constructing a static mixer, said method comprising:

- (a) providing at least two grids;
- (b) positioning one or more crossing elements and one or more slots adjacent to each crossing element in a first grid;
- (c) positioning one or more crossing elements and one or more slots adjacent to each crossing element in a second grid;
- (d) arranging said crossing elements of said first grid at intersecting angles to said crossing elements of said second grid;
- (e) positioning at least one connector between said crossing elements of said first grid and said crossing elements of said second grid; and
- (f) securing said connector to said crossing elements.

19. The method of claim 18, further comprising:
  - arranging said grids such that each crossing element of one grid intersects a slot in the other grid.
20. The method of claim 19, further comprising:
  - providing more than two grids.
21. The method of claim 20, further comprising:
  - positioning one or more crossing elements in each grid.
22. The method of claim 21, further comprising:
  - arranging said crossing elements of each grid at intersecting angles to one another.
23. The method of claim 22, further comprising:
  - positioning said connector between said crossing elements of each grid.
24. A static mixer assembly comprising:
  - a generally ring-shaped fluid flow conduit having a central axis, concentric inner and outer, radially spaced, circumferentially extending surfaces, said inner surface defining a fluid flow path which extends along said axis;
  - one or more static mixers located in said flow path, each static mixer having a first grid comprising one or more crossing elements and one or more slots adjacent to each crossing element and a second grid comprising

one or more crossing elements and one or more slots adjacent to each crossing element,

wherein said crossing elements of said first grid are arranged at intersecting angles to said crossing elements of said second grid; and

at least one elongated connector positioned between and secured to said crossing elements of said first grid and said crossing elements of said second grid.

25. The static mixer assembly of claim 24, wherein said grids are arranged such that each crossing element of one grid intersects a slot of the other grid.